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THE CONTROL OF THE MEAL MITE WITH LINDANE

J. W. CLELAND

Entomological Research Station D.S.I.R., Ashburton

The occurrence of high populations of the meal mite (**Tyroglyphus farinae Linné**) in stored seed, meals, grains, hay, and litter in chicken houses, has become frequent in the Ashburton County in recent years. This mite inhabits dark places and appears like a fine meal-like dust on floors, bags etc. Outbreaks have been recorded in a store containing some thousands of bags of linseed, a woolshed in which newly-harvested ryegrass seed was temporarily stored, and in a recently-built barn in which freshly baled hay was stored. Very often it is not noticed until it breeds up to a heavy infestation.

In a commercial grain store, the mite appeared to be selective. On examination of stacks of grain, seeds etc., it was apparent that those infested had: (1) been stored for two or more years or (2) contained dirty or weed seeds or (3) had been harvested unfit, damp or green; stacks harvested well, and clean seed were unaffected. Infestations occurred in large numbers at the extremes and at the centre of the store.

Baling hay when green or damp provides ideal conditions for the mite, and in one case under these conditions the mite had bred up to extremely high numbers within two months. Presence of high populations also produces moisture and heating.

Storage of these materials beyond one year is a source of danger not only to the old but also to any new grains etc. being brought into store. It is considered that farm sheds are one of the main sources of infestation, as it is a common practice for farmers to keep grains, seeds and processed stock foods in store for several years. These would serve to breed up large numbers of mites and other pests that could spread to harvesters, empty bags etc. stored in those sheds.

A serious outbreak of this mite occurred on a large commercial poultry farm in the Ashburton district. Besides contaminating foodstuffs, the mite bred up in huge numbers in the deep litter used as flooring in chicken houses. At night, the mites left the litter and infested the chickens on the brooder frames. The chickens showed signs of restlessness, then symptoms similar to those of lice infestation, and death resulted in five to six days. Losses were as high as 2.5% of total chickens per day. It is not suggested that the mites were parasitizing the chickens, but the constant irritation caused unthriftiness and eventually death.

Method of Control:

In all cases the gamma isomer of benzene hexachloride (lindane) has proved effective at low concentrations viz. 1 to 2% in dusts or sprays. The use of dusts proved the simpler and more effective method of application, as the particles settle to make a light deposit over the treated materials as well as on rafters, walls, and floors. Treatment of surfaces of bags or bales within stacks can be carried out by inserting extension spouts of dust guns into the interstices between bags. Sprays are neither practical nor desirable as excess moisture may give rise to heating. The outbreak on the poultry farm was controlled with a 2% gamma isomer dust applied to alternate houses as a light uniform deposit. The chickens improved in condition, food consumption increased to normal, and losses decreased until the fifth day after treatment. Thereafter, no deaths occurred, while chickens in untreated houses continued to die. Subsequently, control houses were treated, and losses were reduced to those normally experienced. This work

showed that occasional treatment with a 1 or 2% dust of gamma benzene hexachloride will prove effective against **T. farinae** for several months. While some overseas references recommend against treating young poultry with lindane no adverse effects were observed in this case. Practically 100% control is achieved within forty-eight hours, and the residual life of the insecticide is such that it prevents future infestation of the mite if carried out as a routine treatment as new bags are brought into the stores.

THE DRYINIDAE, A FAMILY OF HYMENOPTERA NEW TO NEW ZEALAND

E. S. GOURLAY,
Cawthron Institute, Nelson

At Beeby's Knob, near Lake Rotoiti, in February, 1929, a collection of jassid leafhoppers and four adult female dryinids was made, on the highest elevations of this long ridge, at an altitude of four thousand feet, by sweeping low herbage with a net. Some of the leafhoppers had attached to their bodies the characteristic larval sacs of dryinids and were photographed later by W. C. Davies of the Cawthron Institute (fig. 1.)

While collecting Strepsiptera at Stephens Island in January, 1933, where the hosts were jassid leafhoppers, dryinid larvae were also found associated with the same hosts. As has been pointed out in the Strepsiptera paper (Gourlay, 1953) the Beeby's Knob and Stephens Island leafhopper material went forward at that time to J. G. Myers who took it to the British Museum, from where it was to have been returned to New Zealand, but after Myers' death all traces of the collection was lost and consequently host identification has not been possible.

So that further hosts, and if possible, both male and female dryinids could be secured, another visit was made to Beeby's Knob on February 23rd of this year. No adult dryinids were seen, although conditions appeared favourable. Leafhoppers were reasonably plentiful, but dryinised individuals few, on the host plant, **Carpha alpina** R. Br. a low growing mat-like member of the Cyperaceae. This is a common plant covering on mountains from the Coromandel Peninsula down to Stewart Island, and occurs even at the Auckland Islands; its altitudinal distribution is from 2500-5000 ft., but it descends almost to sea level at Stewart Island. This plant was referred to erroneously as a low native grass, **Danthonia**, in the paper on Strepsiptera.

Myers (1923), makes a short reference to having seen larvae of dryinids on leafhoppers "The Typhlocybinae are among those leafhoppers parasitized by minute wasps of the family Dryinidae.

None, however, have yet been successfully reared from New Zealand species, nor have I found affected leafhoppers very numerous." No members of this group of leafhoppers has been found, or reported to have parasitism by dryinids since that date, so if Myers' information is correct, another dryinid can be expected to be added to our fauna.

The Beeby's Knob dryinids are remarkably close in appearance and size to some native ants, for which they were first mistaken, but their conspicuous eyes, chelate fore tarsi and much greater speed when running over areas of stony ground formed by snow drifts, amongst the **C. alpina** covering, were so noticeable that it was their capture that lead to investigation and finding the hosts. This area is shown in Fig. 2.

Neogonatopus alpinus n.sp.

♀. Length 3¼ mm.

Glabrous; chestnut; face, mouthparts, three basal and apical four-fifths of terminal antennal segments, anterior coxae, all trochanters, apical quarter of fore femora and all tarsi, except for the pitchy-brown last segments of mid and hind legs, flavous, femora pale chestnut, tibiae pale brown, mid- and hind- tipped apically with chestnut, eyes, antennal segments 5-10 and petiole black.

Head above, twice as wide as long, constricted evenly towards the middle; antennal segments from third, microscopically pilose, gradually incrassate to the sixth segment and then even to the termination, ultimate segment one and a half times as long as penultimate, tapering and terminating abruptly.

Pronotum gibbous, laterally rounded anteriorly and towards the middle where it is broadest, greatly elevated and also narrowed posteriorly; mesonotum elevated and much narrower anteriorly in its apical third where it is cylindric and finely rugose, than the posterior part of the pronotum, the posterior two thirds depressed, transversely corrugate and broadening basally to the same width as the metanotum; metanotum with the dorsal anterior half curvately elevated and smooth on the dise, where there is a small lateral frontal pair of truncate denticulate processes, posteriorly declivous, gradually narrowed, transversely corrugate all tibiae and tarsi minutely and sparingly golden-pilose; abdomen ovate, shining.

Holotype (♀) Beeby's Knob 4000', February, 1929.

Paratypes (♀), the same. Holotype and one paratype in the collection of the Cawthron Institute, two paratypes (one damaged) in collection E. S. Gourlay.

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Myers, J. G., 1923: A contribution to the study of New Zealand leaf-hoppers and plant-hoppers (Cicadellidae and Fulgoridea).
Trans. proc. N.Z. Inst. 54: 407-429. (p.422).

Photo W. C. Davies

Fig. 1: Dryinised Jassids, Beeby's Knob, Feb. 1929.

Photo, Feb. 1954, B. B. Given

Fig. 2: Type locality of **Neogonatopus alpinus.**

RECORDS OF INTRODUCED COLEOPTERA AND NOTES ON THE 1953-54 COLLECTING SEASON

E. S. GOURLAY, Cawthron Institute

In January, 1950, a foreign lucanid found in a house at Hexton was sent by F. Jackson, Instructor in agriculture at Gisborne to the Cawthron Institute for identification, when the writer placed it as **Rhyssonotus nebulosus.** A second specimen, obtained from H. R. Littleworth, Gisborne was forwarded by the Dept. of Agriculture in February 1951, with comment that it was either boring into or living in dead wood of dying ringbarked bluegum trees, for several beetles were found inside tunnels. These remarks would indicate that the species could be established in this country at Gisborne and confirmation of this was given when a third, living specimen was received in December 1953 from E. R. Smythe, Livestock Instructor, Gisborne. where it had been found in a car. The correct identity of this insect is **Rhyssonotus foveolatus** Thunb., with **nebulosus** a synonym. From the information available, it appears possible that the introduction occurred as a result of importation of Australian eucalypt timber; fortunately lucanids attack dead rather than living trees, so **R. foveolatus** is unlikely to become a species of economic importance.

A colourful Australian Cerambycid, **Aridaeus thoracicus** Don., was found running rapidly over flowers in New Plymouth in January, 1954, by Mrs. G. Julian; only one specimen was obtained. Two exotic beetles, though not obtained in the present season are worth recording. They are **Mycetaea hirta** (Marsh.) and **Cryptophagus pilosus** (Gyll.) both of which were taken in Nelson in September, 1942, breeding in a case of old apples which had remained forgotten for two seasons, so that they had become nearly dried out and mummified. Only a small number of adults of each species was taken, before the apples were destroyed. A survey of the foliage feeding habits of adults of Fuller's rose weevil **Pantomorus godmani** Croch which has been established in Nelson for 16 years was taken in April and includes as host plants roses, periwinkles, scotch thistle, wild broom, **Clematis vitalba** Linn., **Solanum nigrum** Linn., **Actinidia chinensis** Planch. and **Talauma candollei** Blume*. Two native trees, whau and karaka were heavily attacked close to ground level and decreasingly up to nine feet.

During November, 1953, a visit was made to Lake Sylvester and adjacent upland areas, lying west of the Cobb Valley in the Nelson province where observations on some insects were made. On a small snowfield just below a ridge and lying to the north above the lake representatives of five insect orders were found immobilised on the surface, some still alive and others appearing to have been dead for some time, though still perfectly preserved. Due to a heavy storm approaching, with no shelter present for three miles, only half an hour was spent on the snowfield in which time the following specimens were secured: Perlaria—two **Nesoperla trivacuata** Till., one **Protonemoura latipennis** Till., three unidentified perlids in one species; Plectoptera—one **Coloburiscus humeralis** Walk., one **Atalophlebia dentata** Eat.; Hymenoptera—three small ichneumons in one species, one large species of **Apanteles;** Hemiptera—a number of alates of **Rhopalosiphum padi** (Linn.), a few alates of **Cavariella aegopodii** (Scop.); Diptera—three **Dicranomyia cubitalis** Edw; six **Dicranomyia** in one species, three specimens in two species of anthomyiids, one tachinid of the genus **Heteria;** Coleoptera—**1 Alloprocas muticus** Broun, 1 small staphylinid. It is noteworthy that no vigorous types of insects were trapped on the snowfield, although a number of grasshoppers and strong flying Diptera was in the vicinity. The greatest proportion of all types found was in the aphids, for large numbers were present; they may have been deposited by air currents from the Cobb Valley 2000′ lower, or could have come from the inflorescence of **Aciphylla munroi** Hook. which grows sparsely in the Lake Sylvester region.

On a long ridge running east from Iron Hill, which is west of Lake Sylvester, a number of "vegetable sheep", **Raoulia eximia** Hook., occur on rocky elevations. On these plants the trypetid fly,

Trypanea centralis Mall. was ovipositing in the sun. Males were difficult to catch for they flew off at the least disturbance, but females, occupied with oviposition, would allow a pill box to be placed over them. Although the flower buds of **R. eximia** were not showing among the tightly packed tops of the plants, flowering occurs in January and February and as some New Zealand trypetids belonging to this group oviposit in composite seed heads, **R. eximia** is probably the host plant of **T. centralis.** A similar relationship exists with **Trypanea longipennis** Mall., which has been reared from seed heads of **Celmisia spectabilis** Hook. the "flannel plant", from river flats of the upper Wilberforce river in Canterbury, Mt. Arthur tableland, Lake Sylvester and Beeby's Knob. The most recent record is that of R. D. Dick, who reared it from the same host at 3000' on Mt. Torlesse range near Springfield, Canterbury, in February of this year. Infested flower heads containing large sized larvae, exhibit a characteristic tufted appearance, when the larvae, having consumed the seeds, move about to provide room for pupation. The writer has known **Tephritis cassiniae** Mall. to behave similarly in the flower heads of its host plant, **Cassinia leptophylla** R. Br., at Tahunanui, Nelson, since 1923. The minute biting midge, **Acanthoconops myersi Tonn.,** has again been reported as occurring in large numbers at the eastern end of Rabbit Island, Nelson, where it has been known to me to occur, since 1925, through irregular visits since that date. Both R. J. Tillyard and A. L. Dumbleton obtained directions for finding them and the latter reported their presence in 1953.

On a ridge to the north of Lake Sylvester, in an area where the predominant vegetation consisted of **Carpha alpina** R. Br., larval workings of the melolonthid, **Chlorochiton discoidea** (Broun) Giv. were discovered, giving the appearance of surface pig rooting. In an aggregate infestation all the roots of this plant had been eaten, allowing dead plant tufts to rise above the surrounding level where they lay loosely on the surface (fig 1). When several larvae are working together the effect is to form a continuous tunnel, as much as three feet in length (fig 2), with divergence on both sides to a restricted degree by individual larvae, all of which remain otherwise isolated from one another; this tunnel is roughly the same depth as that from foliage level to ground level, 4-5 inches, and in it are found many adult elytra as well as the larval population. Infestations are sparse throughout the area examined. Adult flights occur in early January on the Mt. Peel ridge, across the Cobb Valley. Four thousand to four thousand five hundred feet appears to be the common altitudinal range of **C. discoidea.**

Another interesting discovery in this region at 4500 feet is one living specimen of the previously unknown male of the weta **Deinacrida tibiospina** Salm., described from a single female, taken by

G. V. Hudson at Mt. Arthur some years ago. When living, the male measured 32 mm. in length, which reduced to 30 mm. after stuffing and drying.

Thanks are due to Dr. W. Cottier for identifying two aphids and to Mr. J. Johns, of the Forestry Dept. Wellington for the host habitat photographs of **Chlorochiton discoidea.**

=**Magnolia odoratissima** Reinw.

Photo by J. Johns

Fig 1: Aggregate infestation. Plant covering, almost exclusively **Carpha alpina** R.Br.

Photo by J. Johns

Fig. 2: Tunnel feeding area, about 3 ft. long. Slope of 15-20°.

NOTES ON THE OCCURRENCE OF THE EUROPEAN SAWFLY *Priophorus tener* Zadd., IN NEW ZEALAND

L. GURR

Entomological Research Station, Nelson

The European sawfly, **Priophorus tener** Zadd., was recorded for the first time as a pest of raspberry in New Zealand by Jeffreys (1939). It was found damaging raspberry at Winchester in South Canterbury in March 1936, at Ma-waro in mid-December 1936, at Timaru in March 1937, at Kimbell in March 1938, and larvae were found feeding on blackberry at Woodbury in March 1938 (all localities being within a radius of thirty-five miles of Timaru). The author's attention was drawn to this insect in December 1953, when specimens of larvae and prepupae were sent by F. G. Spite, Horticultural Instructor, Department of Agriculture, Masterton, to the Entomological Research Station for identification. These were found on raspberry in a private garden at Westmere, some 10 miles South East of Masterton. E. S. Gourlay found larvae on raspberry in a private garden at Christchurch on 31st January 1954, and the author found larvae in small numbers on raspberry in two commercial gardens at Riccarton on 13th February 1954. Four gardens in the Nelson district (at Nelson city, Wai-iti, Glenrae, and Tadmor) were searched in February 1954 but no sawfly damage was found.

A. G. Kennelly, (**pers. comm.** Feb. 1954), Horticultural Instructor, Department of Agriculture, Dunedin, states that the European sawfly was recorded from a Dunedin home garden a little over a year ago, but has not yet been noticed in commercial plantations.

The slow spread of the insect, a distance of 100 miles in either direction from Timaru in the past 15 years, is consistent with the natural spread of an insect of its size and mobility. Blackberry would provide host plants between plantings of raspberry. The spread to the North Island, however, is unlikely to have taken place in this manner. Jeffries (1939) found that, in the laboratory, late season larvae wandered off the host plant before pupation and built their cocoons at the bottom of the cage. Smith and Kido (1949) found that the raspberry leaf sawfly **Priophorus rubivorus** Rohw. in California spin their cocoons in the soil. The indications are therefore that the overwintering stage is passed on or in the soil at the base of the host plant. The pest could thus be transferred with canes sent from district to district. The origin of the affected canes at Masterton is unknown—the owner purchased them at the auction mart.

Economic Importance:

The larvae eat the leaf, usually working from the undersurface and prefer the mature leaves near the base of the plant. So

far in New Zealand it has never been recorded in sufficient numbers to make it a pest of economic importance.

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Smith, L.M.; Kido, G. S. 1949: The Raspberry Leaf Sawfly. **Hilgardia** 19 : 43-54.

NEW LOCALITY RECORDS FOR *Propolyxenus forsteri* Condé (Diplopoda Polyxenidae).

B. A. HOLLOWAY

Dominion Museum, Wellington

Polyxenid millipedes were first recorded from New Zealand by Hector (1935) who noted that they had been observed in cracks on rock faces in the Wellington District at Lowry Bay, Belmont and Northland, and stated that they had also been seen under bark of trees in several other parts of New Zealand. He did not describe the species although he illustrated his note with photographs of eggs, nests, immature specimens and adults.

Condé (1951) described a new species, **Propolyxenus forsteri** from specimens extracted from leafmould from the foothills of the Southern Alps, west of Christchurch. Condé remarked that the illustrations and description given by Hector **(loc. cit.)** were not sufficiently detailed to allow identification of the species recorded from the Wellington district.

During August 1952 I collected a number of these small millipedes (less than 4 mm. in length) from under the bark of **Leptospermum scoparium** and from two species of **Eucalyptus** at Stokes Valley, Wellington. Two specimens were also extracted from leafmould taken from the base of **Cyathea dealbata** at Stokes Valley. All of these specimens have been identified by Dr. Condé as **P. forsteri.** So far I have been unable to locate any of these millipedes in fissues of rocks and therefore the possibility cannot be yet precluded that the specimens Hector observed in the Wellington District belonged to a different species. I have since observed

Polyxenid millipedes under bark of **Dacrydium cupressinum** in the Wainui-o-Mata waterworks reserve Wellington, and also under bark of **Myoporum laetum** on Stephens Island, Cook Strait.

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Rec. Cant. Mus., 6:9-14.

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Trans. Proc. Roy. Soc. N.Z. 64: 249-250.

NOTES ON LEPIDOPTERA

B. A. HOLLOWAY

Dominion Museum, Wellington

The following species of Lepidoptera which occur sporadically in New Zealand have been noted during the 1953-54 collecting season. The specimens captured are in the collections of the Dominion Museum.

Hypolimnas bolina L. A tattered female specimen of the "Blue Moon" butterfly was captured by F. C. Caughley on 16/2/54 in a garden in Tinakori Road Wellington.

Danaida chrysippus L. (subsp. **petilia** Stoll.) One female specimen was caught at Pukerua Bay, Wellington in early April 1954 by E. Challies. This species is extremely variable in size and colour; the specimen collected was almost perfect with a wingspan of two and a half inches.

Precis villida Fabr. One male was captured in Boulcott Street, Wellington in mid-March 1954, by C. A. Fleming. Dr. Fleming reports that this species was common along the west coast of Wellington during April 1954. Mr. J. Moreland of the Dominion Museum observed an almost perfect specimen on a clay bank half a mile from the coast of Pukerua Bay, Wellington on 6/4/54 and a tattered specimen on a clay bank in the hills, one mile from the coast at Pukerua Bay on 19/4/54.

Ophideras materna L. Specimens of the "Orange-sucker" moth, all in a perfect state have been collected at St. John's Hill, Wanganui on 24/4/54 by Miss Holdroyd; Day's Bay, Wellington on 28/4/54 by Mrs. Baldwinson and at Havelock North, Hawkes Bay on 20/5/54.

O. materna occurs naturally in Northern Australia and a number of Pacific Islands. It probably arrives in New Zealand in cases of bananas.

Chlorochiton discoidea (Broun) Giv. (SCARABAEIDAE COL.). FINAL INSTAR LARVA

J. M. HOY

Entomological Research Station, Palmerston North

The final instar larva of **Chlorochiton discoidea** has an overall length of 35 mm. and a head capsule width of 4.7 mm.

On the EPIPHARYNX (Fig. 1,1) the epizygum is indistinct, zygum complete. Seven heli are arranged in an arched contiguous series. Anterior to heli a row of thirteen punctures is present. Acroparia well clothed with chaetae. Chaetopariae well developed with numerous chaetae but few punctures. Gymnopariae large, free of chaetae and with few punctures. Sitexen slightly sinuous plegmata make up each plegmatium, acanthoparial bristles cultriform, present outside each plegma. Pedium approximately one and a half times as broad and slightly asymmetrical. Crepis apparently absent, no crepidial punctures. Dexiotorma moderately strong with five large punctures and a number of smaller ones. Nesium absent. Laeotorma well chitinized with strong pternotormal process. Six large and a number of smaller punctures in laeotormal region. Manductorial and scissorial portions of MANDIBLE (Fig. 1,3) strongly chitinized. A group of approximately twenty eight punctures in ventro-molar region. Four punctures and two short chaetae in baso-lateral region. On dorsal surface two sensory pits with a small bristle adjacent to anterior pit. Scrobis with long chaeta anteriorly, short chaeta posteriorly and a moderate length chaeta between these.

The palidia of RASTER (Fig. 1,2) absent, tegilla medially united, about forty apically hooked tegillar bristles present.

Material examined:—one specimen collected by E. S. Gourlay, Lake Sylvester 4/11/53.

For explanation of terminology see Hoy and Given (1952).

REFERENCE

Hoy, J. M. and Given, B. B. 1952: A Revision of the Melolonthinae of New Zealand, Part II, N.Z. Dept. of Scientific and Industrial Research, Bull. 102, 172pp.

Chlorochiton discordea—Final instar larva .
1. Epipharynx. 2. Rastal pattern.
3. Mandible, dorsal view.

A NOTE ON THE DEATH OF NASELLA TUSSOCK, *Nassella Trichotoma* (Nees.) Hack., DUE TO THE DEPREDATIONS OF *Chlorochiton* sp.

A. D. LOWE

Entomological Research Station, Ashburton

Nassella tussock is an unpalatable introduced plant which dominates the hill vegetation covering some 80,000 acres of the Waipara County, North Canterbury. It appears in mixed stands

of tussock, but because of preferential grazing by animals on other plant species, and a high seeding rate of Nassella, it quickly dominates the vegetation. On account of its rapid spread, it had been declared a noxious weed, and a special local body, the Nassella Tussock Board, has been set up to attempt its eradication.

During 1953, larval specimens taken from beneath this tussock, near Waiau, were on two occasions sent to this station for identification. They were tentatively identified as **Chlorochiton** sp.

In February, 1954, advantage was taken of a visit to Waiau to survey damage being done to Nassella by this insect at Mt. Highfield Station. At an elevation of some 2000 feet, in an almost pure stand of Nassella, areas of up to half an acre in extent could be seen to be dead or dying. The plants could be easily pulled from the ground by hand. Investigation showed considerable numbers of the same larvae feeding on the root system. Most larvae were large, probably in the final instar, and a careful search revealed only fragmentary remains of adult beetles. An attempt at identification by means of these fragments has led to the conclusion that the beetle is definitely of the **Chlorochiton** sp., conforming to Given's (1952) description of the alpine and subalpine species, viz., "darker green or more complex colourinig, and with coarsely punctate, deeply impressed, elytral striae." Larvae are being reared through to give a positive identification.

REFERENCE

Given, B. B. 1952: A Revision of the Melolonthinae of New Zealand, Pt. 1: 1-137.

RECORDS OF SOME IMPORTANT BRACONID PARASITES IN NEW ZEALAND

ARTHUR W. PARROTT

Wakapuaka Road, Nelson, New Zealand

The purpose of these notes, is to place on record host relations and other observations of certain species of Braconidae occurring in New Zealand. The economic importance of these parasitic wasps warrants a far greater attention being paid to them than has been the case in the past, and any information on their host relationship, distribution or life-history is of the greatest importance to the economic entomologist.

The information set out in the following pages has been obtained from the examination of small collections of braconids from the Plant Diseases Division D.S.I.R., Auckland, Dominion Museum,

Wellington and the Cawthron Institute, Nelson. I wish to express my thanks to the Directors of these Institutions for the opportunity of examining this interesting material.

The nomenclature and taxonomy of the Braconidae occurring in New Zealand will be dealt with elsewhere.

Family: **BRACONIDAE**

Subfamily: **BRACONINAE**

Genus: **BRACON Fabr.**

BRACON HEBETOR Say.

This is a cosmopolitan species, originally described in 1836, from North America. The nomenclature of this species has been much confused, and for details of the synonymy, reference should be made to Muesebeck (1925), Muesebeck, Krombein, Townes (1951) and Parrott (1953).

Richards and Thomson (1932) record this species as having been bred from the following hosts:—**Ephestia kuhniella, E. elutella, Myelois ceratoniae** (doubtfully), **E. cautella, Plodia interpunctella, Galleria mellonella, Paralipsa (Aphonia) gularis, Vitula edmandsii,** and **Sitotroga cerealella.** Of these species **Ephestia** and **Plodia** are by far the most common hosts. In regard to **Ephestia,** this is one of the most important parasites of this pest and European authors have calculated that it exerts over 55% control under optimum conditions, in the case of **E. kuhniella.** New Zealand records of **B. hebetor** are as follows:—

Ex store, Auckland, 1943, coll. D. Spiller.

Ex **Ephestia kuhniella,** Auckland, June 1941. (This specimen was labelled **Chremylus (Penecerus) rubiginosus,** but is undoubtedly a dark form of **B. hebetor.)**

Ex wool-store, Nelson, August, September, and December, 1950. (A.W.P.). In the Nelson wool-store there was a very heavy infestation of **E. kuhniella,** and both male and female specimens of **B. hebetor,** were attracted by the light and could be collected by the dozens on the window panes of the wool-store.

In England **B. hebetor** passes the winter as pupae, the adults disappearing after October and not becoming common again until late June. In South Australia females have been recorded hibernating through the winter. In New Zealand adults are active in late winter, spring and late autumn.

Subfamily: **MACROCENTRINAE**

Genus: **MACROCENTRUS Curtis**

MACROCENTRUS RUBROMACULATUS (Cameron)

For the synonymy of this species reference should be made to Muesebeck (1932) and Parrott (1953). This species has been known in New Zealand as **Fhogra rubromaculata.** However in 1932, Muesebeck, after examining the type of Cameron's **Fhogra rubromaculata** which is the sole representative and type of the genus Fhogra considered that Cameron's genus was synonymous with **Macrocentrus** Curtis. In 1928 Wilkinson described the same species from Tasmania as **Amicroplus tasmanicus.**

These insects are apparently internal parasites of lepidopterous larvae. The majority of species are solitary parasites but a few are gregarious. The gregarious forms are apparently polyembryonic. It has frequently been observed that the adults obtained from a single cocoon or group of cocoons are usually of one sex. The members of this genus are not very specific in their host selection and frequently the same host species may be attacked by several different species of the genus.

Gourlay (1930) records **M. rubromaculatus** from **Melanchra** sp. as a parasite of the larvae, the parasite larvae emerging from the host larvae to pupate. Hudson (1920) records sixty specimens reared from **Melanchra** larvae collected from grasses and other low-growing plants. Dr. R. A. Cumber forwarded to me specimens reared from **Persectania steropastis,** at Paiaka, North Island, in November 1949. Dr. W. Cottier, reared specimens from cut-worms damaging rape at Keri Keri in March 1941. Mr. K. M. Doull, Lincoln College, Canterbury, has reared this species from **Persectania ewingi.** The Agriculture Dept. Fields Instructor at Feilding in 1949, sent in for identification some larvae collected from red-clover which were probably parasitising cutworms, which at that time were abundant. He remarked "The grubs were in a case like a spider's nest". These larvae were reared out and found to be all females of **M. rubromaculatus.**

This species is frequently obtained during the summer months by sweeping pastures and long grass. It is probably generally distributed throughout both the North and South Islands.

Seasonal Occurrence:

From the dates of capture attached to the labels of over 76 specimens, taken at various times and from different North and South Island localities, the following seasonal data were obtained.

Month	Oct.	Nov.	Dec.	Jan.	Feb.	March	April
%	12.5	5.0	10.0	10.0	7.5	40.0	15.0

The total number recorded for each month is expressed as a percentage of the total number of specimens examined. The above

data indicates that **M. rubromaculata** adults occur from October to April, probably reaching their maximum abundance during March.

Subfamily: **EUPHORINAE**

Genus: **PERILITUS** Nees.

PERILITUS COCCINELLAE (Schrank)

A specimen in the Plant Diseases Division collections, Auckland reared from **Coccinella 11-punctata** in Feb. 1942 by T. R. Rabone, has been identified by Mr. G. E. J. Nixon, Commonwealth Institute of Entomology, British Museum. Specimens are in the collections of the Cawthron Institute, Nelson, bred from **Coccinella 11-punctata** during April 1921.

Genus: **METEORUS** Haliday.

METEORUS ATRATOR Curtis

Dr. W. Cottier, Entomological Research Station, Nelson, has collected this species in Auckland from ply-wood infested with **Trichophaga tapetiella.** This is a well-known and widely spread European species and has been accidentally introduced into this country from Europe. Specimens are in the collections of the Plant Diseases Dept. Auckland.

Subfamily: **SPATHIINAE**

Genus: **SPATHIUS** Nees.

SPATHIUS EXARATOR (Linn.)

During March 1953, several specimens of **S. exarator,** were received by the Cawthron Institute, Nelson, from Kelso, Central Otago, and were collected from a house infested by **Anobium** sp. I wish to thank Mr. G. E. J. Nixon of the Commonwealth Institute of Entomology, London, for identifying this well known European species. Nixon (1943) records it from six hosts, including **Anobium striatum** and **A. pertinax.**

Subfamily: **MICROGASTERINAE**

Genus: **APANTELES** Foerster

Although there are several indigenous species of **Apanteles** occurring in New Zealand, the majority have been accidentally or purposely introduced; Muggeridge (1943) gives an account of the introduction of **A. glomeratus** into New Zealand in an attempt to control the white butterfly **(Pieris rapae).**

APANTELES DEMETER (Wilkinson)

Described by Wilkinson (1934), from specimens collected at Bainess near Palmerston North, and reared by Mr. L. J. Dumbleton from **Tortrix** sp. The author has collected it from the Nelson District. The cocoons are white.

APANTELES TASMANICUS Cameron

Described originally from Launceston, Tasmania in 1912 by Cameron. Dumbleton (1935) described the larval stages and the biology and later (1940) gave additional information on its abundance in New Zealand. It appears to be common in the Nelson district, and is probably generally distributed through New Zealand. Dumbleton **(loc. cit.)** states "The species is already present in New Zealand where it is the dominant parasite of **Tortrix postvittana.** and is responsible for a much higher percentage of parasitism than in Tasmania." Dumbleton reared a hyperparasite, a species of **Hemiteles,** from a cocoon collected in Tasmania.

APANTELES SICARIUS Marshall

This almost cosmopolitan species occurs in New Zealand. Specimens have frequently been collected by sweeping pastures and cultivated crops in the Nelson District. There are two specimens in the collections of the Cawthron Institute bred from **Epiphthora melanombra** (Gelechiidae). In Europe this species has been recorded as a parasite of **Plutella maculipennis** Curtis. and in all probability it is associated with the Diamond-back moth in this country and has probably become established many years ago. Unfortunately there are no actual records of it having been reared from this host in New Zealand.

APANTELES CARPOSINAE Wilkinson

Specimens reared from the Raspberry Bud Moth **(Carposina adreptella)** in the Nelson District were described by Wilkinson under this name in 1938. Although I have collected extensively in the Nelson District over the past five years I have not come across this species. It is reported to be a solitary parasite but the cocoons have not been described.

APANTELES RUFICRUS (Haliday)

This well known European species is practically cosmopolitan. It is a variable species and has received many names. For synonymy and hosts of this species references should be made to Parrott (1953). It appears to be common and widely distributed throughout New Zealand. It has been recorded as a parasite of **Plusia chalcites** and a species of Tortrix. The New Zealand cocoons are white, similar to those recorded from Sydney, Australia, but Wilkinson records cocoons from Formosa as yellowish-brown.

APANTELES PLUTELLAE Kurdj

Originally described from Western Europe, in 1912 as a parasite of **Plutella maculipennis.** Much doubt has existed as to the true identity of this species until Wilkinson re-described it in

1939. It superficially resembles **A. ruficrus** but may be distinguished from that species by the darkening of the anterior coxae and by the minute punctuation on the 3rd tergite. **A. plutellae** does not appear to be commonly found in New Zealand. Three specimens without data are in the Cawthron Institute collections, and over several years collecting in the Nelson District I have only taken it on one occasion. No hosts records are known from New Zealand, but it probably attacks **Plutella maculipennis** as a solitary parasite; the cocoons are pale cream-colour.

List of Hosts and their Parasites recorded in this paper

Anobium sp.	**Spathius exarator** (Linn.).
Carposina adreptella	**Apanteles carposinae** Wilk.
Coccinella 11-punctata	**Perilitus coccinellae** Schr.
Ephestia kuhniella	**Bracon hebetor** Say
Epiphthora melanombra	**Apanteles sicarius** Mar.
Melanchra sp	**Macrocentrus rubromaculatus (Cam.)**
Persectania ewingi	**Macrocentrus rubromaculatus (Cam.)**
Persectania steropastis	**Macrocentrus rubromaculatus (Cam.)**
Plusia chalcites	**Apanteles ruficrus** Hal.
Tortrix postvittana	**Apanteles tasmanicus** Cam.
Tortrix sp.	**Apanteles demeter** Wilk.
Tortrix sp.	**Apanteles ruficrus** Hal.
Trichophaga tapetiella	**Meteorus atrator** Curtis.

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RECORDS OF THE AUSTRALIAN BUTTERFLY *Precis villida* (Fabr.) FROM THE WELLINGTON DISTRICT

G. W. RAMSAY, Wellington

The purpose of this note is to record the collection of three specimens of **Precis villida** (Fabr.) during the last summer. On the 29th March 1954 one slightly battered specimen was captured in the Victoria University College grounds, and two more specimens were caught in good condition by Mr B. G. Mills of the Horticultural Research Station, Levin, on the 10th April 1954. This species of butterfly had not been seen at Levin before, where on two successive, fine, hot week-ends specimens were observed frequenting barren stony areas, their usual habitat.

In Australia P. villida also known as the Australian Tortoise Shell or Meadow Argus, is a common and generally distributed butterfly. The adults occur from August to May. Within modern times this butterfly has been extending its range in the Pacific Islands, so it could thus be expected to occur occasionally in New Zealand. During the 10 days prior to the capture of the March specimen there were at least three occasions on which these insects could have been carried across the Tasman Sea to reach the central part of New Zealand, the time taken for such a crossing being about 3 days.

In Australia the larva of this species feeds on plantain **(Plantago),** snapdragon **(Antirrhinum)** and **Verbena.** As the caterpillars are nocturnal in habit and hide under leaves during the day they could easily have escaped observation had they been breeding in this country.

I wish to thank Mr R. Kerr of the Meteorological Office for information concerning the wind conditions in the latter part of March, and Mr. G. Morrison of the Horticulture Division for the loan of two specimens and permission to use them in this note.

A NOTE ON THE CHARACTERISTIC ODOURS OF SOME NEW ZEALAND WETAS (Orthoptera: Gryllacridoidea)

G. W. RAMSAY, Wellington.

When dissecting specimens of **Hemideina thoracica** (White) and **Hemiandrus similis** Ander. I noticed a strong and characteristic odour for each, arising from the gut. These may have been associated with their different diets. Living specimens of **Hemideina thoracica** also show a similar smell. Subsequently I found characteristic odours in four other species.

Family Raphidophoridae

Pachyrhamma fascifer (Walker)

Pachyrhamma acanthocera (Milligan)

Gymnoplectron longipes (Colenso)

Family Henicidae

Deinacrida heteracantha White.

Clean containers in which specimens of the adult cave-weta, **P. fascifer,** were kept for three hours acquired a faint musky odour which was perceptible in living insects of both sexes. Dried specimens from almost airtight store-boxes have a much stronger and more readily recognisable musky odour, which is in no way similar to that of the paradichlor benzene with which the store-boxes are fumigated. I found that dried specimens of **P. acanthocera** and **G. longipes** also had strong musky odours.

Dried specimenes of **Deinacrida heteracantha** have a sweet musky smell but I cannot find any odour on dried specimens of **H. thoracica** or **H. similis.** In the four species of wetas in which the dried specimens have an odour this is of a musky kind and varies inter-specifically in a manner impossible to describe.

I have examined other species of wetas but cannot find any obvious odours on them. This does not mean that a characteristic smell detectible by other wetas is lacking but only that the human olfactory sense is not able to detect the odour, if such be present.

These odours may be a means by which wetas are able to identify and locate other members of the same species and may serve to keep together colonies of gregarious cave wetas, such as **Pachyrhamma fascifer.**

I wish to acknowledge with thanks the guidance of Dr. J. T. Salmon, in the preparation of this note, and the Dominion Museum for the use of specimens of **Gymnoplectron longipes.**

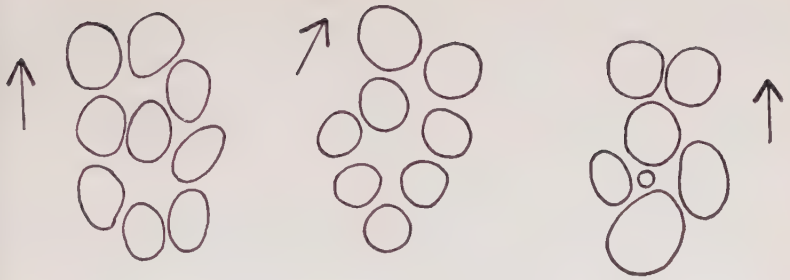
ABNORMALITIES IN THE OCELLI OF COLLEMBOLA

J. T. SALMON, Victoria University College, Wellington

From time to time during my studies on Collembola I have noticed abnormalities in the ocelli of individual insects. Specimens occasionally occur in which the number of ocelli on one side of the head may be less than the number on the opposite side. I have examined specimens of **Platanurida lata** Carp. in which one side of the head had the normal five ocelli and the other side had six. In species of **Triacanthella** I have noticed an ocellus of one side reduced in size while the corresponding ocellus on the opposite side has been of normal size. Such abnormalities that I have noticed concerning the number of ocelli have always occurred among species in which this number is constantly reduced from the eight to each side normally found throughout the Collembola. Some years ago, however, Mr. H. G. King of Henderson, Auckland, sent me two specimens of **Pseudachorutes conspicuatus** Salm. in one of which the number of ocelli in the left side ocellar group had increased in number from eight to nine, while those of the opposite side remained normal at eight. The increase occurs by the addition of an extra ocellus, subequal to the others, in the centre of the ocellar group (Fig. 1). In the other specimen sent by Mr. King the abnormality occurs in the right hand ocellar group which has the number of ocelli reduced to seven, one of which is very small, and another, the posterior one, is greatly enlarged (Fig. 3). The normal ocellar arrangement for **Pseudachorutes conspicuatus** is shown in Fig. 2.

In all other aspects of their morphology these two specimens are quite normal.

Though abnormalities of this nature are exceedingly rare among Collembola, they are, I think, of sufficient interest to warrant bringing them to the notice of other entomologists. In expressing my thanks to Mr. King for sending me these unusual specimens I feel I should at the same time apologise to him for the long delay in the preparation of this note.



J. T. Salmon

Abnormalities in the ocelli of **Pseudachorutes conspicuatus** Salm. All figures magnified X140 at the microscope.

THE OCCURRENCE OF *Achilus flammeus* Kirby IN NEW ZEALAND (Hemoptera; Fulgoroidea; Achilidae)

E. G. TURBOTT, Auckland Museum, and T. E. WOODWARD, University of Queensland

The presence of this Australian species **Achilus flammeus** W. Kirby (1818), in Auckland has been known for some years, and it is considered a record should be made so that others might be induced to search for it more extensively and help to define the limits of its present dispersal and trace any later spread. We have no records of its feeding; information on biology and life history would be of much interest. All the specimens known to us were captured in buildings in Queen Street, in the City of Auckland, frequently on windows. Further details are as follows:

? xii-46 (floor of restaurant), coll. A. Cummings (4 specimens).

10-xii-47, coll. S. R. Salter (1).

xi-50 (2); 30-xi-50 (1); 1950 (7); early ii-51 (1); 15-ii-51 (1); 28-ii-51 (1); 2-xi-51 (4); 6-xi-51 (1); 5-xii-51 (1); 18-viii-53 (6); 10-x-53 (2); 28-xi-53 (2); 5-xii-53 (1); all coll. E. D. Willis.

The species is rather conspicuous being bright red and up to about 16 mm. in total length with the wings closed (the Auckland specimens examined ranged from 11 mm. to 13mm.). It is figured by Tillyard (1926). The only other Achilid recorded from New Zealand is the apparently endemic **Agandecca annectens** F. B. White 1879, a yellowish brown species only about 5 mm. long. Such a

colourful insect as **Achilus flammeus** could scarcely have been overlooked by earlier collectors so that its introduction must have been quite recent. Its apparent restriction to an area not far from the wharves in Auckland supports this. It is rather curious that all the Auckland specimens so far examined are females; it would be interesting to know whether there are any factors of behaviour or life history that might account for this.

One or both of the females caught on 10-x-53 laid 39 eggs in captivity, while several mature eggs are still adhering to the slightly disrupted abdomen of one of the females captured on 2-xi-51. The eggs are white, of a simple elliptical form, without surface sculpture, but with small, spherical, internal granulations showing through in the ovarian eggs. They are ca. 0.7 mm. long and 0.4 mm. wide.

For our specimens we wish to thank the collectors listed above and particularly Mr. E. D. Willis, who has caught and supplied us with material over a period of several years.

We are also very grateful to Mr. A. Musgrave, of the Australian Museum, Sydney, for confirming provisional identifications (first made by E.G.T.) and for the following interesting information kindly given by him (in litt.):

"This Fulgoroid does not appear to be associated with any 'food plant' in the strict sense. I have a note in my catalogue that in Oct.-Nov. 1947, this species emerged in a house in South Strathfield, near Sydney, from underneath skirting boards, and flew thence to curtains near windows or electric light or would settle on walls. They came from underneath the house, averaging about 18 a day. McKeown (1942) suggests that it 'appears to be in some way associated with termites, and its nymphs have been found in their mounds.'

"As certain Australian species of termites have been recorded from New Zealand, perhaps the Fulgoroid has been introduced with them."

This information is very suggestive in its possible implications to the situation in Auckland, and we should like to make a plea, particularly to those concerned with the examination and destruction of termite nests in this area, to keep an eye out for nymphs and adults of **Achilus**. If such an association is found, several interesting problems could be investigated, such as the species of termites involved, the nature of the relations with the termites, feeding habits, and whether copulation may take place before the females leave the nest.

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RECORDS AND OBSERVATIONS OF NEW ZEALAND LEPIDOPTERA

K. A. J. WISE

Plant Diseases Division, Auckland

1. Report on the Oak Leaf-miner.

This report records the distribution and host plants of the oak leaf-miner **Lithocolletis messaniella** Zeller (lepidoptera: Gracillariidae) for the 1953-54 season in New Zealand. Previous records have been published by Wise (1953a, 1953b).

In February 1954 the oak leaf-miner was found in oak and silver birch at Hamilton, and in oak and chestnut at Cambridge. Oaks were found to be infested at Nelson, in the South Island, and at Kumeu, north of Auckland, in March. This insect is now distributed over most of the North Island and in the Nelson district of the South Island.

During this season the miner has become a pest in Auckland, where infestation has followed the same pattern as it did in Hastings (Wise, 1953b). In addition to oaks, European beech, N.Z. red beech, silver birch, and liquidambar were again infested.

Two new host plants, both from Auckland, are:—

Fam. Rosaceae	
Pyrus malus L.	Apple
Prunus sp.	Ornamental Cherry

The record of apple as a host plant is from an infestation in a single tree growing in association with many infested oaks in the Auckland Domain. The moth was identified from one partly emerged adult and from mines. Infestations on several ornamental cherry trees were identified from mines only.

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2. Leaf-roller Damaging Elm twigs.

The common leaf-roller **Tortrix excessana** (Walker) (Lepidoptera: Tortricidae) has been found damaging **Ulmus**, and descriptions of an infestation and of the behaviour of a larva are given.

On 10th September 1953, several infested elm twigs were sent to this Division by the Department of Agriculture, Christchurch. Holes had been bored into leaf scars—one hole in each scar (Plate 1 Fig. 1)—by lepidopterous larvae which had then continued tunnelling under the bark. One larva was exposed when removing the bark to discover the extent of tunnelling. The tunnel was only large enough to accommodate the larva which, on exposure, immediately spun a close web until it was compleely covered again (Plate 1 Fig. 2).

The twigs were set in a pot of damp sand and covered with a lamp glass. Thirty-two days later, one larva (that previously exposed) had left its tunnel, had ring-barked the twig, and was feeding on the bark above and below the ring (Plate 2). By the next day this larva had moved its position and had spun a double webbing between two upright twigs. It was feeding on the bark from between the two layers of its web. Its appearance and habit suggested that it was a leaf-roller. The larva was placed on a fresh leafy elm twig on 28th October. By the following day it had tied three leaves together and was feeding on a leaf within the cell so formed. Pupation took place between 6th and 9th November and a male imago emerged on 27th November. The imago was identified as **Tortrix excessana** (Walker).

Thus it seems that leaf-roller larvae can overwinter beneath the bark of elm, to emerge in the early spring and feed on bark until leaves appear.

Photo by J. W. Endt.

Plate 1—**Tortrix excessana** Walk. on Elm.

Fig. 1: Entrance hole of a larva in a leaf scar. Mag. X3.

Fig. 2: Webbing of larva covering artificially exposed tunnel. Mag. X3.

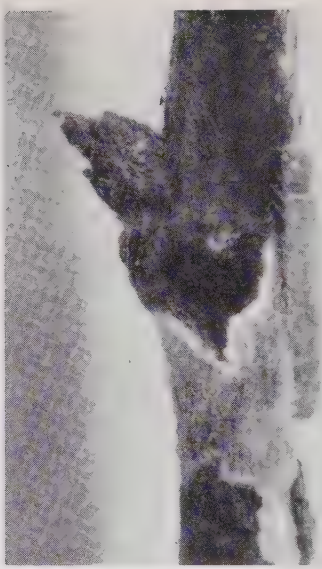

Photo by J. W. Endt.

Plate 2—**Tortrix excessana** Walk. on Elm
Larva feeding on bark. Mag.. X3.

3. Records of Rare Lepidoptera

FAM. SPHINGIDAE

Deilephila celerio (L.)
Kawhia: 8.XII.53, 1 male, **(P. Lawless)** (Auckland Museum collection).

FAM. NOCTUIDAE

Sub.-fam. Catocalinae

Achaea janata (L.)
Auckland: Henderson, Sunnnyvale, at light, 20.III.54, 2 females, **(K. A. J. Wise)** (Plant Diseases Division collection).

FAM. NYMPHALIDAE

Two butterflies, which have been sighted in recent years, are mentioned here for the benefit of collectors. Both were seen in the environs of Auckland. They are thought to be **Vanessa cardui** L. (Mt. Albert, 31.XII.52) and **Precis villida** (Fabr.) (Henderson, Sunnyvale, 4.IV.54). In each case it was possible to observe the specimen for some time but lack of a net prevented capture.

TWO CASES OF SYNONYMY IN THE NOMENCLATURE OF LEPIDOPTERA

K. A. J. WISE

Plant Diseases Division, Auckland

These two cases are brought to notice, as, in each, names which have been classed as synonyms are prevalent in New Zealand literature.

1. FAM GRACILLARIIDAE

Caloptilia Hübner, 1825.

Caloptilia Hübner, 1825, **Verz. bekannt Schmett. (27)**: 427.

Gracillaria Haworth, 1828, **Lepidopt. Brit. (4)**: 527.

Gracilaria Haworth. Zeller, 1839, **Isis (Oken)**: 208.

Type species: **Caloptilia stigmatella** Fabr.

(=**C. upupaepennella** Hb.).

T. B. Fletcher, in "Generic Names used for Microlepidoptera," Pusa, 1929, published the synonym of **Gracilaria** (following Zeller) with **Caloptilia.** Up to the present only **Gracillaria** and **Gracilaria** have been used in New Zealand literature.

Dr. W. J. Hall, Commonwealth Institute of Entomology, London, England, has supplied information, and Prof. Dr. E. M. Hering, Zoologisches Museum der Humboldt-Universitat, Berlin, Germany, has confirmed the synonymy.

2. FAM. NOCTUIDAE

Sub-fam. Catocalinae

Achaea Hübner, 1823

Achaea janata (Linnaeus, 1758).

Phalaena janata Linnaeus, 1758, **Syst. Nat. 10th ed.**: 527.

Noctua melicerta Drury, 1773,, **Illust. Nat. Hist. 1**: 46, Pl. XXIII, fig. 1 (1770) and Index (1773).

Noctua tigrina Fabricius, 1781, **Spec. Ins. 2**: 218.

Achaea janata (Linnaeus). Hübner, 1823, **Verz. bekannt. Schmett. (17)**: 269.

Achaea melicerta (Drury). Guenée, 1852, **Hist. nat. Ins. Spec. gén. Lép. 7**: 247.

Catocala traversii Fereday, 1877, **Trans. N.Z. Inst. 9**: 457, Pl. XVII.

Achaea melicerte (Drury). Meyrick, 1886, **Trans. N.Z. Inst. 19**: 37.

Achaea argilla Swinhoe, 1901, **Ann. Mag. Nat. Hist. (7) 8**: 132.

Ophiusa ekeikei Beth.-Baker, 1906, **Nov. Zool. 8**: 256.

Ophiusa melicerte (Drury). Hudson, 1928, **Butterflies and Moths of N.Z.**: 78.

The above list brings together the synonyms recorded by Hampson (1913, **Catalogue of the Lepidoptera Phalaenae in the British Museum** 12: 536. **Achaea melicerta.**) and those occurring in New Zealand literature.

Dr. W. J. Hall, Commonwealth Institute of Entomology, London, England, and Dr. A. J. Nicholson, Division of Entomology, C.S.I.R.O., Canberra, Australia, have been good enough to supply information that has been of assistance in preparing this list.

Contents

Page.

Cleland J. W.: The Control of the Meal Mite with Lindane 1

Gourlay, E. S.: The **Dryinidae**, a family of Hymenoptera new to New Zealand 3

Gourlay, E. S.: Records of introduced Coleoptera and notes on the 1953-54 collecting season 6

Gurr, L.: Notes on the occurrence of the European Sawfly, **Priophorus tener** Zadd., in New Zealand 11

Holloway, B.A.: New Locality Records for **Propolyxenus forsteri** Conde. (Diplopoda, Polyxenidae) 12

Holloway, B. A.: Notes on Lepidoptera 13

Hoy, J. M.: **Chlorochiton discoidea** (Broun) Giv. (SCARABAEIDAE COL.). Final Instar larva 14

Lowe, A. D.: A Note on the death of Nassella Tussock **Nassella trichotoma** (Nees.) Hack., due to the depredations of **Chlorochiton sp.** 15

Parrott, A. W.: Records of some important Braconid Parasites in New Zealand 16

Ramsay, G. W.: Records of the Australian butterfly **Precis villida** (Fabr.) from the Wellington district 22

Ramsay, G. W.: A Note on the characteristic Odours of some New Zealand Wetas. (Orthoptera: Gryllacridoidea) 23

Salmon, J. T.: Abnormalities in the Ocelli of Colembola 24

Turbott, E. G. and Woodward, T. E.: The occurrence of **Achilus flammeus** Kirby in New Zealand. (Homoptera; Fulgoroidea; Achilidae) 25

Wise, K. A. J.: Records and Observations of New Zealand Lepidoptera 27

Wise, K. A. J.: Two cases of Synonymy in the Nomenclature of Lepidoptera 31

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